MARINE REVIEW.

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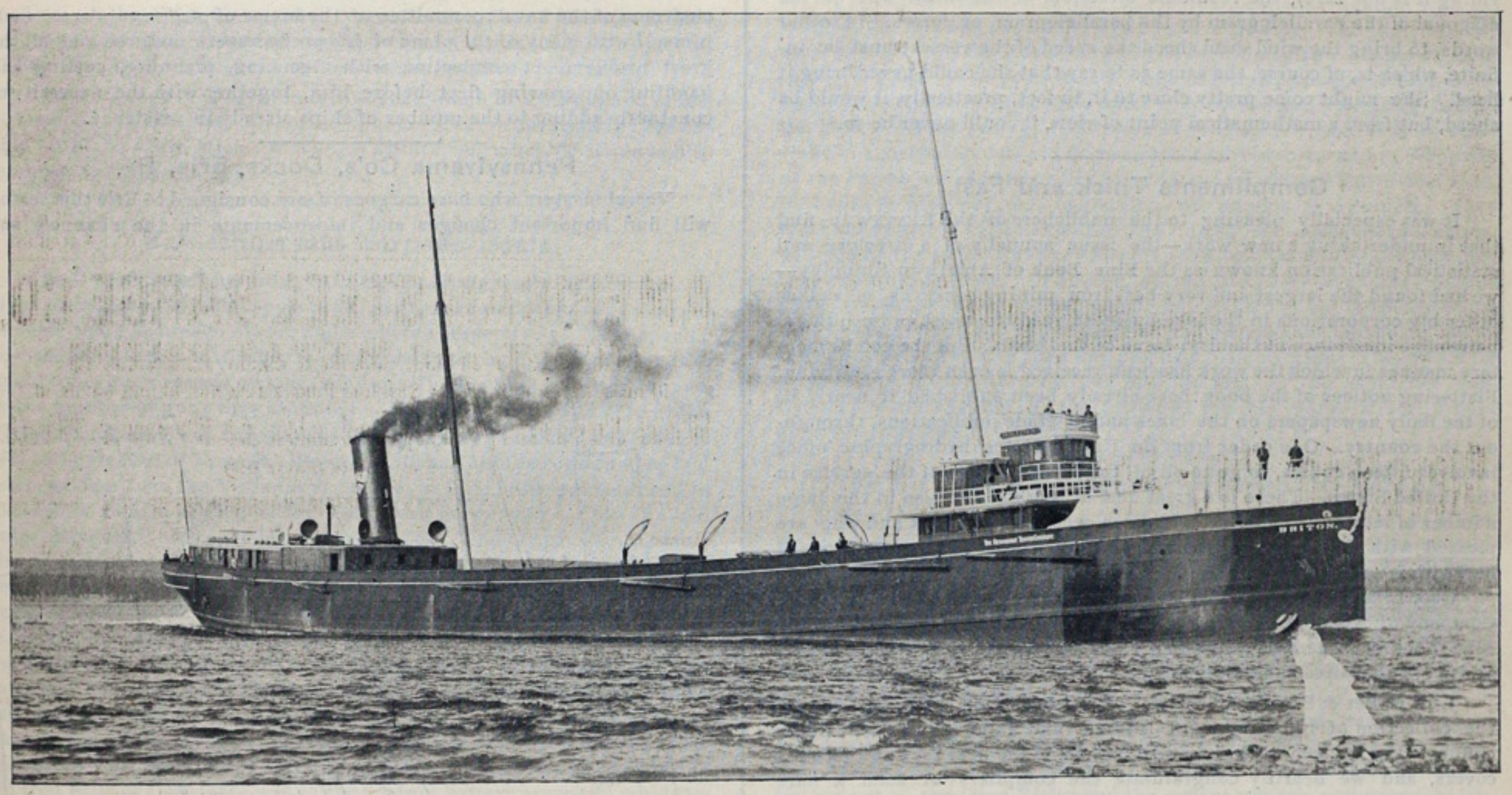
Discouraging Outlook in Freights.

The outlook in lake freights is certainly not encouraging to vessel owners. Ore rates have declined to a basis of 75 cents from the head of Lake Superior and the condition of docks is probably as crowded as it has ever been at this time of year. It has been evident for some time past that a very heavy grain movement would be needed to maintain rates, and now that the demand for vessels to move grain has fallen off almost entirely, the depressed condition of the iron industry is showing itself plainly in the lake freight market. It is quite certain that not more than 6,000,000 tons of iron ore of all kinds, Bessemer and non-Bessemer, has been sold up to this time, and this includes the ores of furnace companies that consume the product of mines which they control. This statement in itself is enough to account for the falling off in freights.

Those companies show no disposition, however, to reduce prices, as it is admitted on all hands that such a course would do no good. It is really surprising that the lake freight market has been upheld thus far, in view of the depression in iron and in other lines of trade. Of course the iron and steel that is now being sold at very low prices has not been made from high priced ore and coke, and a change in the situation with renewed buying of raw materials must come latar on, but how soon no one can tell. There is, therefore, nothing to cause an early change for the better in lake freights. In fact the outlook is very discouraging, unless a renewal of grain shipments occurs shortly.



ONE OF THE MUTUAL LINE STEEL STEAMERS, THE BRITON, RUNNING INTO THE SAULT RIVER.

Policy of German Ship Owners.

The Institute of Naval Architects, which is largely a British organization, but which has quite a membership also in France and Germany, held its last meeting in Germany, and as a result considerable interest was shown in the ship building industry of that country. One of the principal papers, read by a German member, Mr. C. Ferd, brought out a few important points regarding the practice and policy of German ship builders and ship owners. Mr. Ferd said:

"The ordinary plain cargo steamer, the ocean tramp, is a species that has prospered but very indifferently in Germany, where I think she cannot be worked as economically as in England. Over and over again owners who have began with tramp steamers have ended by finding them employment in some regular line, or they have been swallowed by the lines. It is probably due to this fact that our steamers show a coefficient of fineness seldom over 0.76, and I know of scarcely a German steamer with as full lines as there are many of under the Britsh flag, approaching or even exceeding 0.8.

"Forced draught is not much believed in in this country, and some of its devotees have been cured of their partiality at their own expense. Perhaps ill-luck in the beginning has deprived us of the courage to go in for the right system and give it a thoroughly fair trial.

"Our attention has been turned to the turret deck ship, and there is now at Flensburg a so-called elliptical steamer building, which is expected to be an improvement upon the Sunderland type.

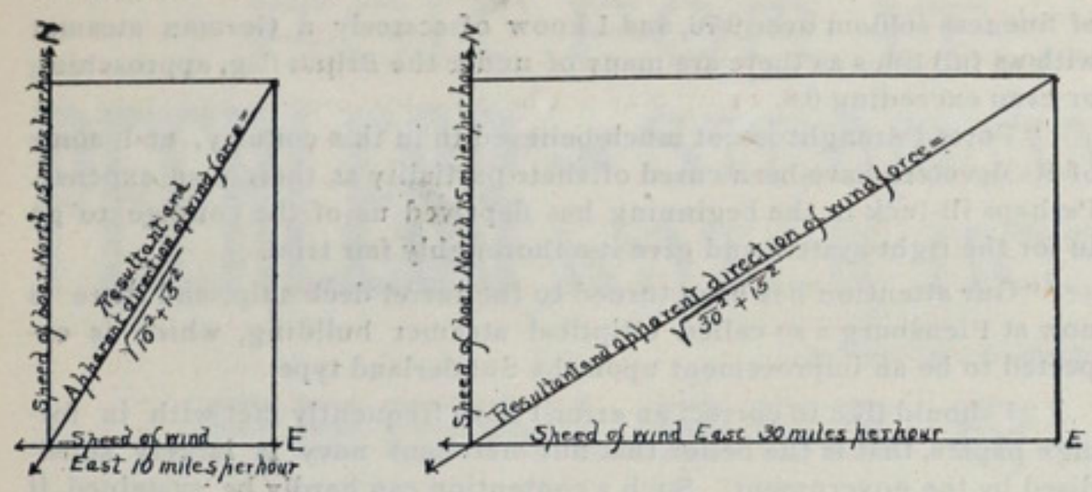
"I should like to correct an error I have frequently met with in foreign papers, that is the belief that our merchant navy is largely subsidised by the government. Such a contention can hardly be sustained, if you consider that, with the exception of two mail subsidies (one of $1,000,000 yearly for the eastern and Australian service and another of $220 000 for an East African line), there are no subventions, premia, surtaxes, or privileges of any shape or form, in favor of ships built or owned in this country over those of other nationalties.

"Legislation, which is doing so much in certain countries to hamper enterprise, has not quite spared us, but it has, so far, been satisfied to let ship owners look after themselves, provided they do everything that can be desired to render navigation as safe as possible, and indemnify sailors who have come to grief through accidents at sea, and their widows and children. A mutual accident insurance association, to contribute to which is compulsory on every German ship owner, has to assess the pensions fixed by law, and to levy the yearly contributions; and, as it has thus become the joint interest of ship owners to prevent accidents, the association is empowered to enforce whatever it deems imperative for the safety of life and limb on board ship. Its regulations embody, therefore, a great many things provided for by the English life saving appliances and other acts, and its surveyors, guided by the advice of the Germanic Lloyd, are fulfilling the duties incumbent upon the board of trade officials in England. We have not yet seen the wisdom of imitating the English load-line act, but we have our bulkhead committee pondering on the solution of the problem of rendering our ships unsinkable, and thus satisfying the clamor of the landsman in this regard."

Rates to Chicago lower than via. other lines are offered by agents of the Nickel Plate road, July 3d, 4th, 5th and 6th, returning until July 12th, account the national democratic convention. 129 July 3

A Problem of Wind and Ships' Speed.

A Detroit correspondent asks the following questions: "If a steamer is traveling due north and the wind is blowing from due east, ten miles an hour, how fast will the steamer have to run to bring the wind dead ahead? Also, how fast will a steamer have to run to bring the wind dead ahead, when the wind is blowing from due east thirty miles an hour and the steamer running north? These questions are easily answered by


N
Speed of boat North 15 miles per hour
Resultant and apparent direction of wind force
$\sqrt{10^2+15^2}$
Speed of wind East 10 miles per hour
E
N
Speed of boat North 15 miles per hour
Resultant and apparent direction of wind force
$\sqrt{30^2+15^2}$
Speed of wind East 30 miles per hour
E

anyone accustomed to dealing with such problems. They can always be worked out by the parallelogram of forces. The two following diagrams will explain this:

It is apparent that in every case the resultant direction of the wind is the diagonal in the parallelogram of forces. Now, no matter how great the speed of the ship may be, or how small the force of the wind, (providing it is not zero), the resultant direction of the wind will be the diagonal of the parallelogram by the parallelogram of forces. In other words, to bring the wind dead ahead the speed of the vessel must be infinite, which is, of course, the same as to say that she could never bring it head. She might come pretty close to it, in fact, practically, it would be ahead, but from a mathematical point of view, it could never be so.

Compliments Thick and Fast.

It was especially pleasing to the publishers of the REVIEW to find that in undertaking a new work—the issue annually of a directory and statistical publication known as the Blue Book of American Shipping—we had found the largest and very best iron mining concerns, as well as other big corporations in the lake business, ready to assist us by a liberal patronage in advance of the first issue of the book. But the complimentary manner in which the work has been received is even more gratifying. Flattering notices of the book have already been published in nearly all of the daily newspapers on the lakes and in trade publications throughout the country. One order from the United States hydrographic office involves fifteen copies, to go to all of the branch offices of the service in the United States. There is a great deal of satisfaction also in the large number of letters from those who have received the book and who are pleased with it. Extracts from some of these letters are printed herewith:

Geo. L. McCurdy of Chicago, manager, lake department, Insurance Company of North America—"After a careful study of contents of the Blue Book of American Shipping I am convinced that it is comprehensive, exhaustive and invaluable."

J. E. Miller & Son, coal dealers, Port Huron, Mich.—"In our opinion the collection of information, of interest and value to every business connected in any way with marine interests, is the best ever put between covers, and we heartily congratulate the compilers of such a sure success."

Foster Engineering Co., New York—"It is unique and beautiful in every respect; a splendid specimen of the highest style of business art. We congratulate you on its appearance and have no doubt of its value to all concerned."

H. E. Schmuck, Springfield, Mass.—"The book is up to the standard which all of your publications have maintained, and is a valuable work of information for anyone interested in lake matters."

Wm. P. Anderson, chief engineer, department of marine and fisheries, Ottawa, Can.—"I beg to congratulate you on the successful issue of your Blue Book, on the handsome way in which it is got up and on its interesting contents. I am sure it will prove a useful book of reference in my office."

Laidlaw-Dunn-Gordon Co., Cincinnati, manufacturers of pumps—"Your Blue Book is very handsome and well gotten up. Please forward another copy to our Mr. Henry Laidlaw, No. 23 Bennett building, Detroit."

Hudson River Line, New York and Albany Day Boats, New York—"I inclose check for Blue Book. It is very handsome and the information highly valuable."

Philip Hichborn, chief constructor, United States Navy—"I acknowledge with pleasure receipt of a copy of the Blue Book of American Shipping. Please accept my appreciative thanks and the assurance of continued well wishes. The book is both interesting and instructive, and attractive in every way."

Charles P. Caldwell, deputy collector of customs, Sandusky, O.—"Your Blue Book in all respects proves to be an exceptionally excellent publication."

Work of the Naval Secretaries.

In an address before a small party of naval architects and yachtsmen in New York recently, Lewis Nixon showed how the idea of a new navy was gradually developed among the people of the United States. The earlier vessels were appropriated for in separate bills, but in 1885 the money for new ships was voted in the regular naval appropriation bill, thus giving it a right of way, and always securing a hearing for the demand for new ships. His resume of the work of the various secretaries of the navy was in a few words an excellent history of the new navy. He said:

Senator Chandler began the new navy with four splendid ships and awakened public sentiment to its support.

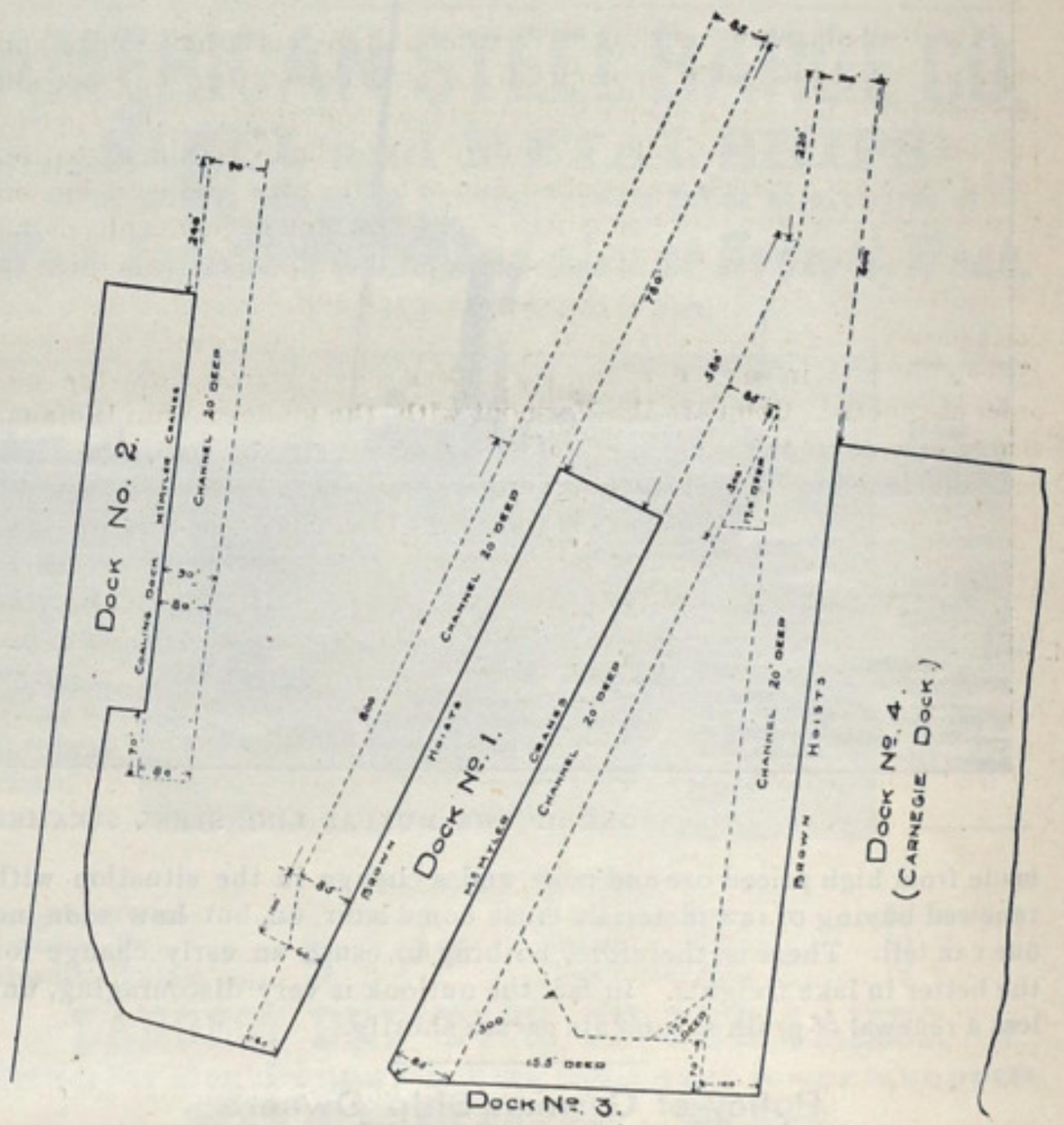
Mr. Whitney brought about a continuous naval policy and domesticated gun and armor making and other industries that were necessary to make the United States self-contained in ship building, and made it possible to replace the wooden ships by powerful steel protected cruisers.

General Tracy, by his firm advocacy, brought the battleship and first-class protected cruiser to the front, introduced Harveyized nickel-steel armor and gave the United States a war navy.

Secretary Herbert, who had aided in all the above as member and chairman of the naval committee of the house of representatives, finds himself with many of the plans of his predecessors matured and all the great problems in connection with financing, manning, coaling and handling our growing fleet before him, together with the necessity of constantly adding to the number of ships already in existence.

Pennsylvania Co's. Docks, Erie, Pa.

Vessel masters who have cargoes of ore consigned to Erie this season will find important changes and improvements in the channels and



docks of the Pennsylvania Co., at that point. A sketch of the channels and docks, prepared by W. G. White, engineer of maintenance of way for the Erie & Ashtabula division, Pennsylvania Co., is presented herewith.

Two Japanese naval constructors were in Washington, a few days ago, and will visit the yard of the Cramps as well as that of the Union Iron Works, San Francisco. Their visit has again caused talk of the Japanese government placing a few orders here for war ships.

The solid through trains between Chicago, Buffalo, New York and Boston via the Nickel Plate road are models of modern equipment. Rates lower than via other lines. 134 July 3

Cargo and Speed Record—Lake Freight Ships.

The steel steamer W. D. Rees, owned by Capt. Thomas Wilson of Cleveland and built by the Cleveland Ship Building Co., has just delivered at South Chicago the largest cargo of ore ever carried by a steamer through the St. Mary's Falls canal. The full weight of the cargo (not bill of lading weight) was 3,876 gross or 4,341 net tons. It was expected that the Mutual line steamer Coralia, which has carried the largest loads ever moved on the lakes, surpassing all records in the Lake Michigan trade, would also make a big showing on Lake Superior, but on the limited canal draft she carried only 3,799 gross tons, full weight, from Two Harbors to South Chicago. This marked depreciation in cargo on light draft is due, the owners of the Coralia say, to the fact that she carries more weight of material in her structure than most steamers of her dimensions now being built.

Iron ore—Coralia, Mutual Transportation Co. of Cleveland, 4,738 gross or 5,307 net tons, Escanaba to Ashtabula, draft of 16 feet 1½ inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,569 tons gross or 5,117 net tons, Escanaba to South Chicago, draft of 18 feet. Lake Superior cargoes—Schooner Aurania, John Corrigan of Cleveland, 3,928 gross or 4,399 net tons, Duluth to Ashtabula on 14 feet 4 inches draft; steamer W. D. Rees, Wilson Transit Co., Cleveland, 3,876 tons gross or 4,341 net, Two Harbors to South Chicago, draft of 14 feet 4 inches.

Grain—Selwyn Eddy, Eddy Transportation Co. of Bay City, 130,820 bushels of wheat, Detroit to Buffalo; steel schooner Martha, Minnesota Steamship Co., 163,000 bushels of corn, South Chicago to Erie on 15 feet 4 inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 246,673 bushels of oats, Chicago to Buffalo.

Coal—S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 45 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 67 hours and 50 minutes, 14.7 miles an hour.

Battleships and Torpedo Boats.

The United States has now, built and building, eight battleships and eight torpedo boats. The appropriation just secured from congress will increase these figures to eleven and eighteen respectively. The specific purpose for which a battleship is designed is to hold the line of battle. In old times such vessels were called line of battleships, and were known by the number of guns they mounted. The first line of battleship in the United States navy was the seventy-four gun ship America, presented in 1782 to Louis XVI of France. Between 1815 and 1820 ten others were laid down, among them the Vermont at Boston, in 1818. She was launched in 1848 and is now in service at the New York navy yard. How the old order changeth! Compare the Vermont with the modern ship Indiana, also in service at the same yard. The old name, line of battleship, has been shortened to battleship, the number of men in the crew has been reduced from 900 to 450, the seventy-four guns have been cut down to sixteen, and the time to build is now required to be less than three years. But the size of the ship has been increased from 4,100 to 11,000 tons, and the price has gone up from $151 a ton for the Vermont to $455 a ton for the Indiana. The 8-inch smooth bored and thirty-two pounder guns have given way to 13-inch and 8-inch, and 6-inch breech loading rifles delivering steel bolts with a velocity of 2,000 feet a second, as against the old iron balls of 1,000 feet; and in the modern battery are found rapid-fire and machine guns, weapons unheard of in the days of the 74's. Three-quarters of a century have seen wood displaced by steel, sails by twin screws and manual labor by machinery. The one factor unchanged, yesterday and today, is the man behind the gun.

Battleships are necessarily the most important factors in a naval engagement. They constitute the main body, as it were, to make the attack and to stand the defense. Theirs is the duty of fighting to a finish. A battleship must needs be of large size, for only on great displacement can she be provided with the best known powers of offense and the most improved means of defense. The powers of offense are the gun, the torpedo and the ram, each of which has been championed as the superior of the others, though the consensus of opinion assigns the first place to the gun. Not until that weapon has failed to do its work and the contestants are at close quarters—within 600 yards—will the torpedo be resorted to, and only when collision is determined upon will the ram be called on to give the coup de grace. The means of defense are armor plating and the interior subdivisions of the ship. In general the heaviest plating is to be found in a partial belt along the water line in the wake of the boilers, engines and magazines, and on the turrets, in which are mounted the largest guns. A less thickness of metal is commonly worked into the athwartship bulkheads connecting the ends of the belt armor, and a still lighter protection is usually accorded the other guns of the main battery. There is also a steel armor deck at the water line covering over the whole under-water body of the ship.

Against a torpedo the battleship has to rely on her interior subdivisions. There is below water a second hull within the one exposed to the water. These two hulls—double bottoms they are called—are connected together by longitudinal and transverse frames, so as to make a honeycomb of small water tight cells. In addition, the whole interior of the ship is divided into many larger compartments, any two of which can be flooded with water without endangering the stability. Perhaps a torpedo exploding under a ship may not be able to force a hole into the vitals large enough to cause her to sink. Still, the few ships which have been torpedoed have gone to the bottom. To escape destruction from the ram the same means are relied on; but here, again, the ship rammed has usually been sunk. Speed is not of paramount importance to a battleship. Of course the faster ship can ram the slower, other things being equal, but not when the slower ship is the quicker at maneuvering. Maneuvering qualities—the ability to turn quickly in a short space, to stop, to go on, to back, to move this way or that, to withstand the force of sea and wind—these are desiderata which a speed of from 15 to 18 knots is considered adequate to insure. A fair square stand up fight to the death is what is expected from a battleship, and no odds asked. The battleships of our navy can put up just such a fight.

The other type of vessel to be added to our navy is the torpedo boat, the smallest and weakest of vessels, as the battleship is the largest and most powerful. The torpedo boat weighs 100 times less than the battleship, is about a third as long, a tenth as wide, a fourth as deep and costs fifty times less. The necessary factors for the success of this little vessel are speed and non-visibility. These qualifications, together with her weapon, the torpedo, constitute her offensive powers. On the first two must she also rely for means of defense, together with a couple of small rapid fire guns. A torpedo boat is a fighting craft, though her sphere of operations is limited to smooth water near coasts, and a running fight is the kind she must put up. With tremendous speed—from 25 to 30 knots—she is expected to dart out from under some cover to within 600 yards of the enemy and discharge her torpedo, a cigar shaped bolt 17 feet long, 18 inches in diameter and containing 100 pounds of dynamite. Then must she skurry back quickly, for both during the advance and retreat will she be the target for every machine gun and small arm the adversaries can bring to bear. Of course, should she have sent her torpedo home, the safety of her retreat would be decidedly improved; however thus far in warfare, the moral effect of the torpedo has proved to be of considerably more value than any practical demolitions. The attack of torpedo boat against torpedo boat will be met by the rapid fire gun. But such warfare is not to the purpose; the big game is the proper quarry.—Iron Age.

The First Direct Shipment of Wheat to Europe.

Editor MARINE REVIEW: Having read the statement of Capt. Andrews, that Capt. I. T. Morris of Chicago, in the schooner Correspondent, carried the first direct shipment of wheat to Europe in 1858, I desire to say that the schooner Dean Richmond sailed direct either in 1854 or '55 to Liverpool and opened this trade. I got from Mr. Richmond, at his office in Chicago, full particulars of the voyage at the time, and afterward got from the builders at Cleveland the lines of the vessel, and published the whole in the Nautical Magazine and Naval Journal of New York, of which I was co-editor and proprietor. Mr. Richmond was not long in finding out that such vessels as could then make the trip were too small to be successful carriers. With all the pains I took to put on record the voyage of the Dean Richmond the owner was too penurious to become a subscriber.

WM. W. BATES.

Denver, June 9, 1896.

Engineer-in-Chief Melville of the navy has determined upon some interesting experiments to determine the value of cast steel as shafts for men of war. All shafts now in service are made of forged steel, which is very expensive. For instance, a shaft is now on its way to Mare island for the Mohican which is of forged steel 11 inches in diameter and weighing 20,000 pounds, for which the department pays about 30 cents per pound. For cast steel the department will pay about 6 cents per pound. It is believed by engineer officers that for small ships cast steel shafts will be of service, but they will not do for the larger men-of-war. —Army and Navy Journal.

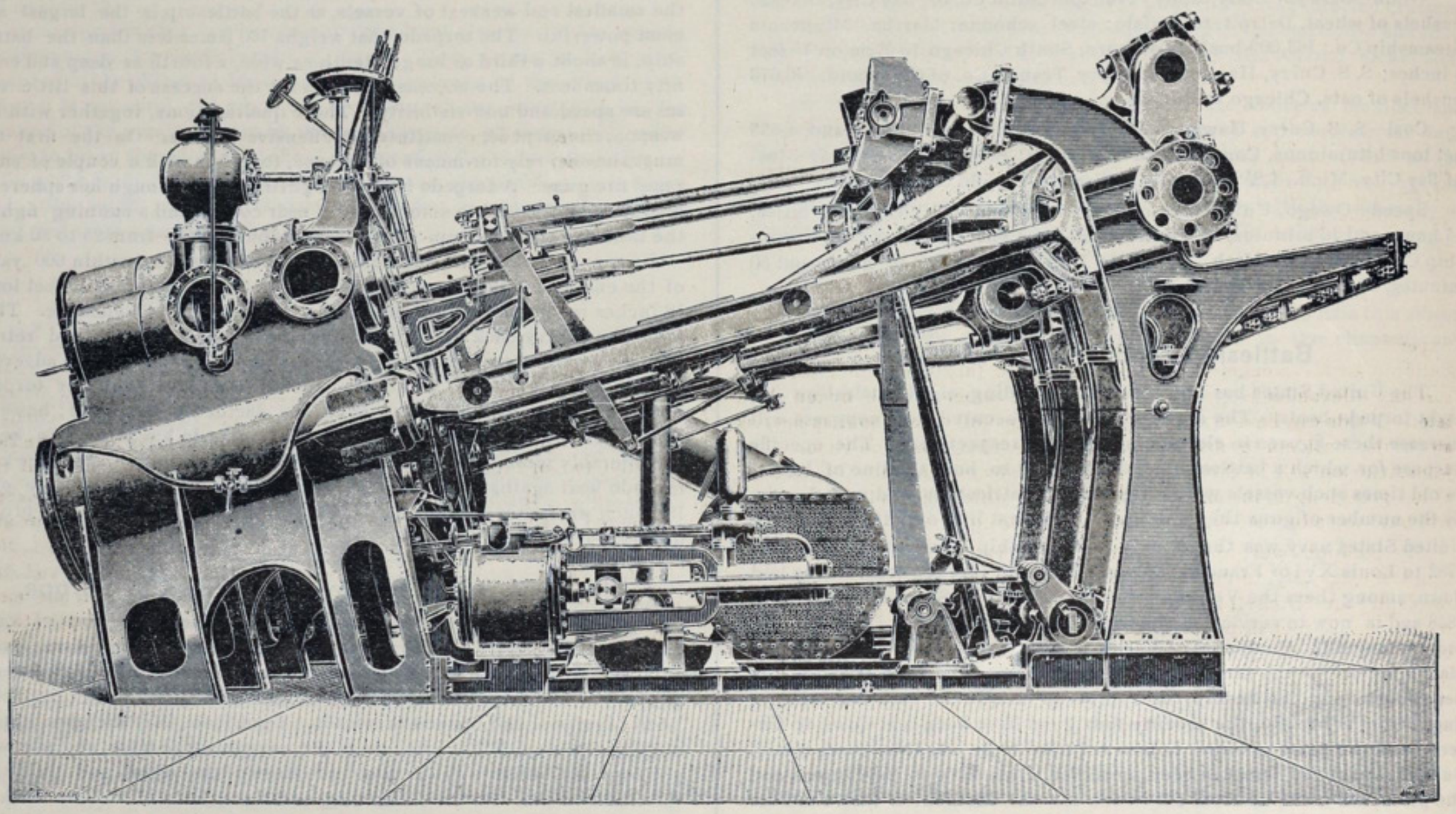
Secretary Herbert has directed that new boilers and engines be put in the cruiser Atlanta at the Brooklyn navy yard, in accordance with the provision of the naval bill appropriating $100,000 for that purpose. The proposition to fit the Atlanta with twin screws will not be carried out, and she will remain a single screw vessel.

You save from $1.50 to $3.00 by purchasing tickets via. the Nickel Plate road. Solid trains and through sleeping cars between Chicago, Buffalo, New York and Boston. 136 July 3

High-Speed Excursion Steamer.

Another high-speed paddle steamer, built by the famous Clyde builders of this type of ship, Messrs. Denny Bros. of Dumbarton, Scotland, is described and illustrated in a recent number of the Engineer of London. The steamer is the Southend Bell, now in service on the Thames. She ranks among the best pleasure steamers in England, and is quite a fast boat, having made 21½ miles an hour on her trials. Her dimensions are 249 by 30 by 10½ feet.

The Engines are of the direct-acting triple expansion diagonal type, having cylinders 28, 41½ and 60 inches, with a length of stroke of 5 feet. The valve gear is upon the fixed quadrant principle, the valves being on the top of the cylinders, thereby reducing the athwartship space occupied, and bringing the gearing within convenient reach of the engineer. Piston valves are fitted to the high pressure and intermediate cylinders, and a flat slide valve with balance rings to the low pressure. The entablatures of the engines are of cast steel, and stayed at top with a cast steel tube carrying the valve motion quadrants, which are also of cast steel. Centrifugal circulating pumps are used. The air pump is worked off the main engine, as also are the sanitary and bilge pumps. The air pump discharges the water into a tank, from which it is pumped to the boilers by a pair of direct-acting pumping engines, each of which is sufficient to feed the boilers when the vessel is developing full power. A feed filter



TRIPLE EXPANSION DIAGONAL ENGINES FOR A HIGH-SPEED PADDLE STEAMER.

is fitted on the main feed-pipe range, and is found to act very efficiently in preventing the passage of grease or oil from the engines to the boilers. Steam is supplied to the engines from two boilers of the navy type, having in all six furnaces, and working at a pressure of 160 pounds per square inch. They are worked upon the closed stokehold principle, and air is supplied to them by a large fan driven by a enclosed engine, which, along with the steering gear, stands upon the deck over the boilers. The joints to the pipes exposed to high pressure are made by patent flanges, and the main steam pipes are hooped with steel bands, to strengthen them against the risk of bursting.

Around the Lakes.

Boats drawing 13 feet 9 inches are now permitted to pass through the Welland canal. The limit formerly was 13 feet 6 inches.

A raft of logs containing 52,234 pieces, measuring 4,028,717 feet and valued at about $32,000, was towed across Lake Huron to Bay City a few days ago.

Five vessels of a total length of 1,191 feet and of 4,918 tons, were recently passed through the Canadian lock at Sault Ste. Marie at once. The vessels were the steamer City of Grand Rapids, length 135 feet; steamer Spokane, length 311 feet; schooner Iron King, length 265 feet; schooner Iron Queen, length 275 feet; and tug F. H. Stewart, length 65 feet.

Officers and directors of the Pittsburg & Lake Angeline Iron Co., elected in Cleveland Wednesday, are: President, James Laughlin, jr.; vice-president, John W. Chalfant; secretary and treasurer, W. G. Pollock; mine agent, A. Kidder. Directors: James Laughlin, jr.; John W. Chalfant, George M. Laughlin, B. F. Jones, jr., William G. Mather, W. G. Pollock, D. C. Phillips, E. R. Perkins and Alfred Kidder.

Capt. J. V. Tuttle of Milwaukee, who was engaged in the work of recovering copper jettisoned from the steamer Centurion, when she was ashore at Isle Royale, Lake Superior, last fall, says he is quite certain that every bar of the copper was recovered. The value of the copper recovered is $120,945, and the shortage on the entire amount carried by the Centurion at the time of the disaster is only $38.35. Capt. Tuttle attributes this shortage to the hurried disposition of what was landed from the steamer at West Superior immediately after her release, preparatory to going into drydock.

It is expected that arrangements now being made between the Cleveland Commercial Co. and the Baltimore & Ohio Ry. will result in quite a large business in grain for the Atlantic seaboard being given to the Cleveland Steel Canal Boat Co. The elevator which it is proposed to use for this purpose is the old Otis elevator, which is not far from the mouth of the river, and which has not been actively operated for a long time past. When the new steel canal boats now building are all in service, Manager Wheeler expects to have a tow leave Cleveland for New York every week.

Superintendent Kidd of the barge company's works, West Superior, has gone to Montreal to assist Capt. McDougall in the work of cutting the steamer Colby and the barge 110 in two before taking them up the St. Lawrence. When these boats went through to the Atlantic from the lakes they were not cut in two, as they descended the rapids in places where dimensions of canal locks where limited. It would be impossible, however, to ascend the rapids en route to the lakes, as the boats would be in danger of going to pieces on the rocks. The barges 202 and 201, which accompany the Colby and tow, will come through all of the canals without any difficulty. Several expert workmen from the West Superior yard are with Superintendent Kidd.

Names for twenty torpedo boat destroyers, for which contracts were let recently by the British admiralty, are as follows: Albatross, Coquette, Cygnet, Cynthia, Arab, Kestrel, Bullfinch, Dove, Cheerful, Mermaid, Fairy, Gipsy, Osprey, Leopard, Otter, Sylvia, Violet, Express, Flirt and Fawn.

A contract for a steel rolling mill building, 103 feet wide and 112 feet long, for The Pennsylvania Bolt & Nut Co. of Lebanon, Pa., has been secured by the Berlin Iron Bridge Co. of East Berlin, Conn. The building will have a steel frame, and roof and sides will be corrugated iron.

Ship Yard Matters.

A Detroit correspondent says: "Although no fuss is being made by the management of the Frontier Iron Works over the big job of putting w triple expansion engines into the steamer Merida, it is expected that the work will be completed about as rapidly as anything ever undertaken on the lakes. Of course the rebuild will be practically equal to new engines. The intermediate cylinder (the only one not damaged) has been tested and found to be all right, and will be used again in the new construction. James Balfour, engineer of the Merida, who was injured through falling into the hold of the Merida at the time of the accident, is now about rid of his injuries. Now that the steamer Senator has been launched by the Detroit Dry Dock Co., practically the whole force of that concern, in engine works as well as ship yard, will be concentrated on the two Rockefeller ships. The Senator was towed to the Orleans street works from Wyandotte the day after the launch and machinery is now being placed in her. It is expected that the steel lumber carrier Aragon, which is to be owned by C. R. Jones and others of Cleveland, will go into commission with the close of the present week. The steamer Iron Age, which has received a new boiler, is also ready for service."

The big freight steamer Senator, which was launched Saturday at the Wyandotte yard of the Detroit Dry Dock Co., was quite fully described in our issue of June 11 on page 11. She is 420 feet long over all, 400 feet keel, 45 feet beam and 28 feet deep, with twelve hatches and a water bottom 5½ feet deep. Two of the hatches are forward of the pilot house, but the after house is placed far in the stern, giving a clear deck as in other steamers of her kind. Cylinders of engines are 22, 36 and 58 inches diameter by 44 inches stroke, and there are two boilers, each 13 feet 6 inches by 12 feet, allowed 165 pounds working pressure. The two Rockefeller steamers building at Wyandotte will be in nearly all respects similar to this boat. The Senator is owned by the Wolverine Steamship Co. of Detroit, composed of John B. Roby, president and general manager; James McMillan, C. L. Freer, F. J. Hecker, M. W. Humphrey, the estate of the late Capt. Peck, A. McVittie and others. She will be sailed by Capt. E. B. McQueen with Andrew Carter as chief engineer.

Reports from the works of the American Steel Barge Co., West Superior, are to the effect that the whaleback steamer John Ericsson, building for Mr. Rockefeller, will be launched July 6, and that her consort, the Alexander Holley, will go into the water a week or ten days later. If this can be done, the barge company will come about as near as any of the builders to delivering the Rockefeller boats on time. The John Ericsson will be the largest whaleback steamer afloat. On account of her great length, the size of the slip into which she is to be dropped will have to be increased a little before launching.

Preparations were made to launch at the yard of F. W. Wheeler & Co., West Bay City, to-day (Thursday), the steamer Lagonda, building for Capt. John Mitchell and others of Cleveland. The Lagonda is not one of the 400-foot ships but she is a very large steamer, as her dimension are 384 by 45 by 26½ feet. With this steamer launched, Wheeler & Co. will still have on the stocks the steamer and two consorts which they are building for Mr. John D. Rockefeller, as well as the big car ferry steamer building for the F. & P. M. Ry. Co.

It is certainly strange that some masters of lake vessels have such little regard for lights, stakes, buoys, etc., which are put out for the express purpose of helping them to pass through narrow and shallow channels. Then, too, the gross carelessness shown in connection with the removal of some of these aids to navigation is amazing. A case in point is reported to Capt. Geo. P. McKay by J. J. Lynn of Port Huron. Mr. Lynn says: "I wrote you regarding the steamer Calvin baving carried away, some weeks ago, the stake and float to which I have been giving attention here. It so happened that it fouled his rudder and he stopped down the river and got it clear. Then he took both stake and float on deck and carried them the round trip to Kingston and return. While passing up the river on his return, and when abreast of the middle ground, he dropped the stake overboard, about 75 to 100 feet south-west from the Sarnia elevator, and foolishly enough, he let it go, with stone attached to it, in the middle of the channel, where the water was deep enough to put it out of sight. You will readily understand that there is danger now of some steamer breaking her wheel, or doing injury to herself otherwise, unless the place is swept with chain and line and this obstruction removed."

Officials of the Central Vermont Railway are said to be so well pleased with the new freight steamers which the Delaware River Ship Building Works has just completed for them that they are likely to give the Chester (Pa.) company a contract for a new excursion steamer for use next spring.

An advertisement elsewhere in this issue announces that the Toledo Yacht Race Association is desirious of contracting with steamboat owners for the carrying of passengers to Lake Erie from Toledo, during the series of yacht races that are to take place in the latter part of August.

In General.

James Gordon Bennett is said to be preparing to have built on the Clyde a steam yacht of 3,300 tons and 6,000 horse power.

Orders for three big twin-screw steamers for the North German Lloyd Co., for which tenders were recently asked of British ship builders, have been given to three German concerns.

There are now 204 ports in the United States where any American sailor, disabled or stricken with illness, may receive hospital accommodations, which are provided free of charge by the national government.

The average tonnage of vessels using the Suez canal increased from 2,398 tons in 1894 to 2,400 tons in 1895. The average time occupied by vessels in the canal during 1895 was 19 hours 18 minutes, and the average duration of steaming through the canal 16 hours 18 minutes. Compared with 1894 that represents a diminution of 57 minutes in the time occupied by vessels in the canal and 23 minutes in the actual steaming through it.

The Russia, a new cruiser, and the largest vessel ever built on the Neva, was launched recently. Including her ram, this vessel is 480 feet over all, and her greatest breadth is 68 feet. Her displacement is 12,195 tons and the horse power about 17,000. She has thirty-two Belleville boilers and a coal carrying capacity of 2,500 tons. Her armor was made by the Carnegie company in this country. A larger cruiser for the Russian government, one of about 14,000 tons displacement, will follow this vessel.

On Sept. 30 last the great Peninsular & Oriental Steamship Co. stood possessed of ships, property and funds invested amounting to $18,500,000, after deducting all current liabilities, the valuation of the fleet having been arrived at after a charge for depreciation had been year by year regularly set apart from gross profits. The average distribution of dividend made during the past ten years, after providing for depreciation and insurance losses has amounted to $916,400 per annum, and is equal to 7½ per cent. on the previous subscribed capital of $11,600,000.

Passenger lines like those of the Detroit & Cleveland Steam Navigation Co., Goodrich Transportation Co. and others do a very large business on the lakes, but it can hardly be compared with the great patronage of the Fall River Line out of New York. Hotel people in the east are predicting a brilliant season, with unusually heavy pleasure travel, and the Fall River line, owning the steamers Priscilla, Puritan, Plymouth and Pilgrim, largest and most elegant ships of their kind afloat, has arranged to put these boats in commission together, between June 29 and Sept. 6, two of them running nightly between New York and Fall river.

Probably the most interesting article ever written about asbestos appeared in a recent number of the New York Evening Post. Our attention was directed to it by the H. W. Johns Manufacturing Co., No. 87 Maiden Lane, New York. The article is written very cleverly and treats of the mineral itself, its manfacture and the thousand and one uses to which it is applied; what it is and where it is found; its applications in mechanical, electrical and domestic fields; interesting novelties and oddities of use, etc. The article will prove interesting reading to anybody who has used asbestos in any form. A copy of it can probably be secured by application to the New York firm. It is not an advertisement but a valuable summary of information on the subject.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes on June 20, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago	13,753,000	5,516,000
Duluth	8,942,000	9,000
Milwaukee	450,000	2,000
Detroit	81,000	12,000
Toledo	244,000	41,000
Buffalo	691,000	185,000
Total	24,161,000	5,765,000

As compared with a week ago, the above figures show at the several points named an increase of 67,000 bushels of wheat and a decrease of 153,000 bushels of corn.

Letters bearing the following names await claimants at the marine post-office, Detroit: Geo. Adams, Louis Anderson, Harry Brown, Mrs. W. B. Barnes, E. A. Barker, John Carlson, James Carlton, Henry Curran, Herman Dupont, John F. Grant, Will Garey, Deno Grayson, A. E. Hunt, N. Humphrey, Hugh Luxton, John Lower, John T. McAdams, Will Mackin, Joseph J. Mounusso, Louis Peters, Capt. J. C. Perene, James Roberts, Harry Rang, Chas. M. Smith, Roger Smith, Arthur Simmons, Wm. Schenk, G. W. Todd, Fred Twist, A. Treilieb, Theodore Young.

Low rate, short limit tickets between Cleveland and Lorain have been placed on sale via the Nickel Plate road at $1.00 for the round trip. 77-7-31

MARINE REVIEW

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, O by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

Entered at Cleveland Post Office as Second-class Mail Matter.

The books of the United States treasury department on June 30, 1895, contained the names of 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598.72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels	1,755	857,735.13
Sailing vessels	1,100	300,642.10
Unrigged	487	83,081.91
Total	3,342	1,241,459.14

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Gross Tonnage.
Year ending June 30, 1891	204	111,856.45
" " " 1892	169	45,968.98
" " " 1893	175	99,271.24
" " " 1894	106	41,984.61
" " " 1895	93	36,352.70
Total	747	335,433 98

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895.*	1894.	1893.	1895.	1894.	1893.
No. vessel pass'ges	17,956	14,491	12,008	3,434	3,352	3,341
T'n'ge, net registd	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of Navigat'n	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about ¼ per cent. of the whole, but largely in American vessels.

FEW PEOPLE realize the importance of a single order given to any of the lake ship builders for a freight steamer of the modern kind, much less the great cost of material and labor involved in the contracts for thirty or more of such ships, which were placed with all of the lake builders last fall. It is an easy matter to consider the imposing dimensions of a city building that might be built for $250,000 to $275,000, which is about the cost of a modern lake steamer. The great mass of iron or steel frames, stone, brick, etc., in such a building is apparent and there is plain evidence also of great labor cost in putting these materials together. But the ship afloat, even though she may be 400 feet in length, is not always viewed in the same light by the ordinary observer, and yet the figures covering material alone in the ship are astounding. Mr. F. A. Kirby, superintendent of the Wyandotte yard of the Detroit Dry Dock Co., presents some figures along this line regarding the steamer Senator, just launched by that company, that are convincing. The Senator is 420 feet long, 45 feet wide and 28 feet deep. Her weight approximates 2,000 tons. The plate of various kinds used in her construction, if piled up one plate on top of another, would make a pile 126 feet 6 inches high. This represents, of course, only thickness of plate. If placed end to end these plates would cover a surface more than five and a half miles in length and 5 feet in width. The total length of shape material, such as beams, frames, etc., to which plates are attached in the vessel, if placed end to end, would be more than 17 miles. The number of holes punched in material used in this steamer is 877,642, and the sum of the diameters of these holes is 10½ miles. There were 390,140 rivets used of a total weight of 83.13 tons. The total number of single day's work represented on the boat up to the time of launching was, 23,869. These figures have no reference to engines, boilers or auxiliary machinery.

IF THE United States hydrographic office, navy department, is not eventually made of great service to the lakes it will not be the fault of Commander Sigsbee, who has been in charge of the office since the first effort was made to furnish information to lake vessel masters, through the publication of new charts, sailing directions, etc., and through the establishment of branch hydrographic offices at Chicago and Cleveland. Commander Sigsbee is now on the lakes, and will devote propably two or three weeks of his time to investigations pertaining to the work of his office. He will spend several days at the Sault, talking with vessel masters when it is possible to do so while they are passing up and down from Lake Superior, and he will make trips on different vessels, consulting with the captains and profiting by their views on various subjects pertaining to the hydrographic service. Commander Sigsbee is anxious to have a branch office established at Sault Ste. Marie, and his visit to that point will have to do also with the matter of establishing this new office when funds are provided for it. It is unfortunate, on account of his interest in lake work, that he will probably not be in charge of the Washington office for more than a year to come. In about a year he will come up for promotion and may go to sea. It is quite generally understood, however, that the work of the hydrographic office, under his charge, has been about as thoroughly systematized as that of any other bureau in the various departments of the government.

NOTWITHSTANDING the shabby treatment afforded lake vessel owners by the light-house board during the last session of congress, officers of the Lake Carriers' Association will not give up the effort to secure further additions to the number of aids to navigation on the lakes. It is understood that Treasurer McKay and Secretary Keep of the association are already preparing a list of lights, fog signals, etc., for which appropriations will be asked in the short session of congress this winter. The list will be quite a large one. They propose to continue suggestions to the light-house board and to act with the light-house service as far as possible. This is why preparations are being made so early. The district officers of the light-house service will soon be making their recommendations for another year, and Messrs. McKay and Keep intend to call upon, or communicate with these district officers by letter, before their estimates are submitted to the board.

SHIP BUILDERS and ship owners of eastern states who worked hard for the adoption of a shipping plank in the national platform of the republican party have reason to feel gratified with the result of their effort. They got all that they asked for. Lake vessel owners showed no special interest in this feature of the platform, but the man who was at the head of affairs in St. Louis, Mr. M. A. Hanna of Cleveland, is the senior member of a concern that controls about as many ships as any one firm in this country. In the platform the policy of "discriminating duties for the upbuilding of our merchant marine and the protection of our shipping in the foreign carrying trade" is favored to the end that American ships—the product of American labor employed in American ship yards, and manned, officered and owned by Americans—may regain the carrying of our foreign commerce.

IT HAS BEEN said of the late Capt. E. M. Peck that whenever it was possible to do so, he placed in command of his vessels men who had secured their early training on river tugs, especially such of these tugs as were engaged some years ago in towing schooners through the rivers. He sought such men to command his steamers. He was of the opinion that the tug captains made good steamboat men. There are other vessel owners who are of this same opinion. They say that any captain may make good time when outside, in the open lake, but the captain of tug experience knows the channels and channel banks, in some cases even better than the ranges indicate them. It may be that there is not much in this argument, but it is a fact, nevertheless, that, the captains and mates of river tugs who have been given command of steamers have been very successful in the big boats.

ALTHOUGH BRIDGE bills, manning bills and measures of all sorts affecting lake commerce were introduced in the last session of congress, all necessitating a great deal of attention from vessel owners, masters and others, the only measure of importance pertaining directly to the lakes that became a law was that providing rules for the navigation of St. Mary's river. This law was demanded by all lake interests, and as far as can be learned it is now being enforced without great difficulty and with general satisfaction. Of course, there was also the marine engineers' bill, which requires citizenship of all engineers, but this was a measure pertaining to engineers in all parts of the country.

NATIONAL PRESIDENT GEORGE UHLER of the Marine Engineers' Beneficial Association recently visited Chicago and Milwaukee and was royally received by the members of the organization. Mr. Uhler is now located at the Sault, where he will remain for an indefinite period looking after the interests of the association and conferring with the engineers as they pass through the locks, where he can meet more of them than at any other one point.

Fourth of July Excursion Rates are offered between any two stations within 200 miles on the Nickel Plate road. Ask agents. 132 July 3

Lake Erie Docks.

LIST OF DOCK COMPANIES AND MANAGERS AT THE VARIOUS PORTS—A SUMMARY OF EQUIPMENT IN ALL CASES, INDICATING CAPACITY OF THE DOCKS—VIEWS OF VARIOUS KINDS OF DOCK MACHINERY.

(*From Blue Book of American Shipping.*)

During a season of a little more than seven months of navigation in 1895, 8,112,228 gross tons of ore was received at docks on Lake Erie, while there was loaded into cars for shipment to furnaces within the same period 6,339,496 tons. These figures will serve to show the great capacity of these docks, which are in most cases equipped with machinery capable of unloading vessels of the largest type (3,500 to 4,000 gross tons capacity) in a single day. The names of dock companies and managers and the statement of equipment that follows refers only to ore. At these same ports about 6,000,000 to 6,250,000 tons of coal, hard and soft, was loaded into vessels during the season of 1895, but on account of changes that are being made in the equipment of coal docks, notably the construction of coal car dumping machines, it was not thought advisable to try to prepare a statement of the equipment on these docks.

BUFFALO AND TONAWANDA, N. Y.

Buffalo Furnace Co., F. E. Bachman, manager, M. A. Hanna & Co., of Cleveland, sales agents.—Four McMyler cantilever machines, which are movable; will work hatches of 16 feet centers and over. Capacity of plant, 90 to 140 gross tons per hour, depending upon vessel and kind of ore. It is expected that rock dredging in Buffalo Creek will be completed in May, 1896, so as to provide 19 feet of water over the rock from city zero.

Delaware, Lackawanna & Western Railroad Co., Erie Basin, A. Fell, western freight manager.—Six-rig Excelsior hoist, built by Excelsior Iron Works Co., Cleveland; capable of unloading 2,000 gross tons in ten hours. All rigs can be worked on any vessel having hatches of 24 feet centers or less.

New York Central & Hudson River Railroad Co., J. A. Barton, agent.—All machinery and appliances used on this company's dock in former years for handling iron ore, etc., has been removed and sold, and the dock is now utilized entirely for the accommodation of flour trade.

Minnesota Dock Co., C. E. Hebard, superintendent, operated by Pickands, Mather & Co., of Cleveland.—Five McMyler revolving derricks on dock and two of same type on lighters. The latter are for steamboat fueling business and are available for handling ore when required.

Lehigh Valley Railroad, Tifft Farm, A. C. Lanctot, agent.—One Brown rig with three legs; work of constructing second Brown hoist under way May 1, 1896. Four McMyler rotary derricks were also being placed on dock May 1, 1896. They can be used for unloading ore in case of emergency.

Buffalo Dock Co., Blackwell canal, office 65 and 66 Erie County Bank Building.—Six McMyler rotary derricks and tramways for storage service.

Tonawanda Iron and Steel Co., North Tonawanda.—Brown hoisting and conveying plant of four legs.

ERIE, PA.

Erie & Pittsburgh Ry., H. T. Raser, superintendent for M. A. Hanna & Co., of Cleveland.—Twelve Brown hoists of 1896 design; plant not in readiness on May 1, 1896, but completion of it was being hurried.

Philadelphia & Erie Ry., Davis Rees, agent.—Five McMyler revolving derricks of 1890 design; all in good order and capable of unloading 2,500 tons per day of twelve hours.

Carnegie Dock, J. L. Burnett, superintendent for Pickands, Mather & Co.—Brown hoisting and conveying machinery, twelve legs.

CONNEAUT, O.

Pittsburg & Conneaut Dock Co., E. Day, superintendent.—Two Brown rigs of three legs each, one King rig of two legs and six revolving derricks; also two King rigs of two legs each under construction, May, 1896.

ASHTABULA, O.

Pittsburg, Youngstown & Ashtabula Ry. Co., (Pennsylvania side), Geo. B. Raser, superintendent for M. A. Hanna & Co.—Three plants, one of which has ten legs and two of which have eight legs each. Two of these plants, built by the King Bridge Co., of Cleveland, are modern in every way and can be divided up to work any number of hatches. The third is stationery, 24 feet centers. There are also on this dock nine revolving derricks, which can be worked any way in which they are fitted to vessels.

Lake Shore & Michigan Southern Ry. Co., J. P. Manning, agent.—Docks Nos. 1 and 2, operated by Minnesota Dock Co , (Pickands, Mather & Co.), Ed. S. Henry, superintendent, have Brown rigs of ten and twelve legs, respectively. Dock No. 3, operated by Angeline Dock Co., (J. H. Outhwaite & Co.), J. H. Burton, superintendent, has one Brown rig of six legs and five McMyler rotary derricks. Dock No. 4, operated by Superior Dock Co., (Oglebay, Norton & Co.), R. J. Pleasance, superintendent, has one Brown rig of six legs, six McMyler rotary hoists, and six hoists made by Variety Iron Works, of Cleveland. Dock No. 5 has a Brown rig of six legs but in May, 1896, a car dumping machine for loading coal was being erected on this dock, and if successful the dock will probably not be used for ore. Dock No. 6, operated by Mahoning & Shenango Dock Co , (J. H. Outhwaite & Co.), J. H. Burton, superintendent, has Brown rigs, eight legs, and three McMyler rotary derricks.

FAIRPORT, O.

Pennsylvania & Lake Erie Dock Co., Wm. Truby, manager.—Five Brown rigs; two of four legs each and three of three legs each. The three rigs of three legs each can be used together or separate. There are also on this dock eighteen McMyler revolving derricks, which are used for unloading direct into cars.

CLEVELAND, O.

N. Y., P. & O. Dock Co., M. Riley, superintendent.—Nine Brown plants of three rigs each, making a total of twenty-seven rigs. All are portable and can be divided up in any way desired. Three to nine vessels, according to size, can be unloaded at this dock at one time.

Cleveland & Pittsburg Dock Co., M. Andrews, superintendent.—One plant of eight legs, five plants of three legs each, and one plant of four legs, all of Brown type and modern in all respects. Machines can be moved to accommodate any number of hatches.

Cleveland, Canton & Southern Railroad, H. R. Moore, agent.—Five McMyler rotary hoists, three of which are rigged for unloading ore; capacity, 1,350 tons per day.

C. C. C. & St. L. Ry. Co. (Big Four), A. J. Ehrler, agent.—This company does not make a specialty of ore business at Cleveland, but has two McMyler rotary derricks on lower flats that can be applied to unloading ore.

Cleveland Rolling Mill Co., J. H. Early in charge of ore business.—Four rigs, Murgatroyd patent type, of two legs each, at Central blast furnaces; quick working and modern; can use four rigs on one vessel or two rigs on each of two vessels.

River Furnace.—Eight dredge cranes, built by Noble & Hall of Erie Pa. About four of these cranes can be used to advantage on a vessel.

Valley Railway Dock, George Madison, superintendent.—Five McMyler rotary hoists, capable of unloading a vessel of medium size in twelve hours.

LORAIN, O.

Cleveland, Lorain & Wheeling Railway Co., E. M. Pierce, agent.—Brown hoists, six legs, erected in 1895, and of improved type; also, nine revolving derricks, of McMyler and Excelsior manufacture, handling buckets of two tons capacity, and one revolving derrick handling buckets of five tons capacity. Five of the two-ton revolving machines will be bunched in future at one station and four at another, permitting of either four or five of these machines being worked on large vessels. At the five-ton revolving machine there is a double track, which permits of eight cars being worked at one time in loading coal. This same arrangement prevails at both the four and five machine dock. At the stations where four and five two-ton machines are located, either ore or coal can be handled to advantage, but he rotary plant having five-ton buckets is used for coal.

HURON, O.

Huron Dock Co., O Steadman, superintendent.—One hoisting and conveying plant of four legs and six rotary derricks, all of McMyler manufacture.

SANDUSKY, O.

C. C. C. & St. L. Ry. Co., (Big Four), E. E. Moore, agent.—Five revolving derricks of Excelsior type.

Baltimore & Ohio Ry. Co., B. A. Galleher, agent.—One plant of six legs, called "Beckert" derrick; can be moved to suit hatches.

TOLEDO, O.

Toledo & Ohio Central Ry. Co., E. L. Jamison, agent.—Three unloading stations with three revolving derricks for each. Derricks are of Excelsior and McMyler kind.

Cincinnati, Hamilton & Dayton Ry. Co., A. W. S. Irvine, agent.—Three McMyler rotary hoists capable of caring for about 100 gross tons per hour.

Wheeling & Lake Erie Ry. Co., W. H. Vance, agent.—Ore business of this company is now conducted at Huron.

Hocking Coal and Ore Transfer Co., W. A. Todd, superintendent.—Five rotary derricks.

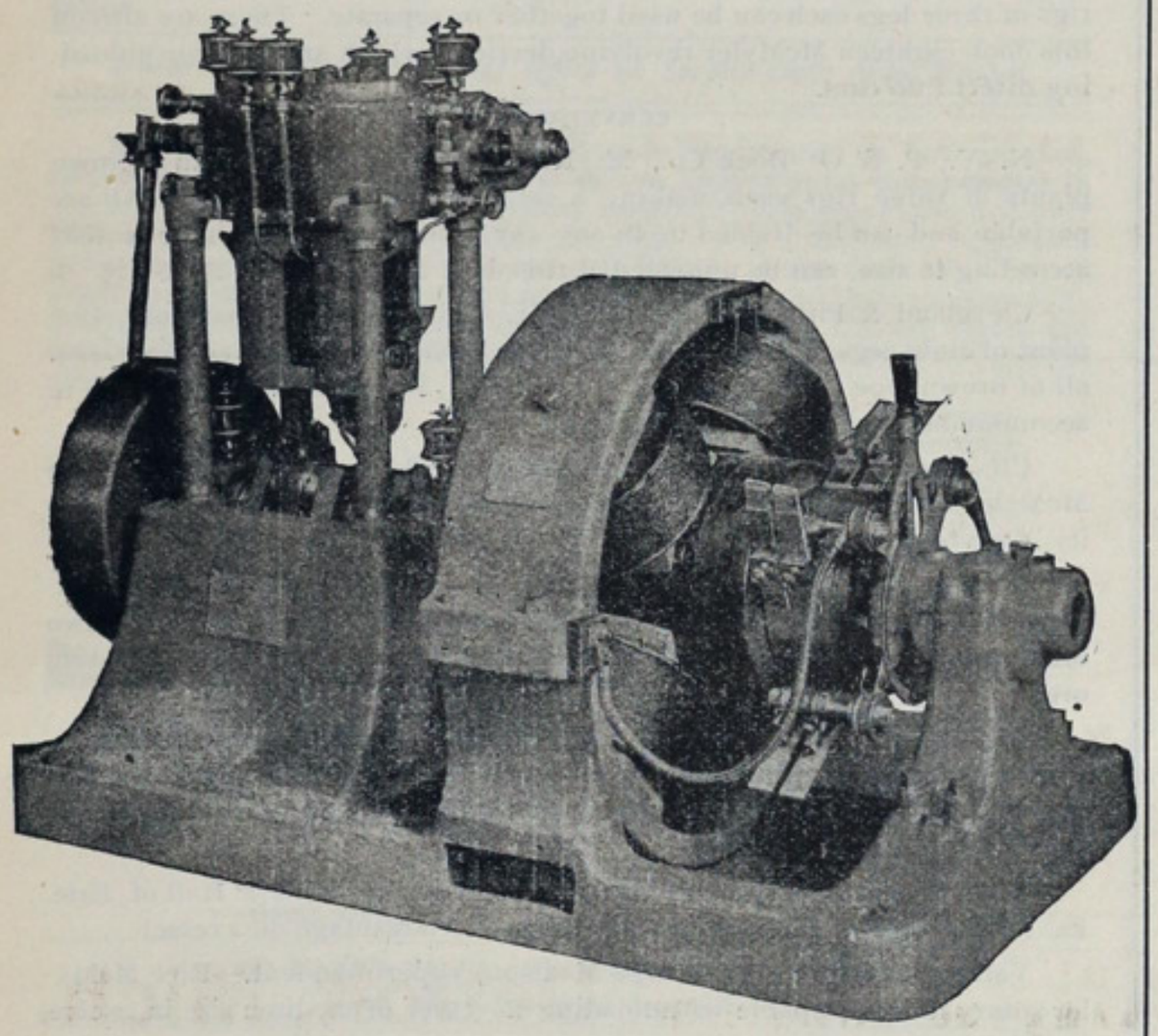
Uniformed colored porters attend to the wants and comfort of first and second-class day coach passengers on the through trains of the Nickel Plate road. Rates lower than via. other lines. 135 July 3

Round trip excursion tickets between Cleveland Lorain may be secured via. the Nickel Plate road at $1.00. 79 July 31

One dollar round trip excursion tickets between Cleveland and Lorain are on sale by agents of the Nickel Plate road. 78 July 31

Engine for Special Use in Lighting Ships.

One of the most important requirements in an electric plant for shipboard lighting and power is the smallness of space in which both engine and dynamo can be set up consistent with efficiency of operation and satisfactory service. In marine electric practice, the General Electric Company of Schenectady, N. Y., has had a wide and varied experience, and having installed a very large number of marine plants on all classes of vessels, both merchant and naval, has full knowledge of the necessary requirements. This company has brought down marine dynamos to their smallest practical size, and in order that they may be



operated most efficiently, has also developed a line of steam engines to which the dynamos may be coupled directly. The capacities of the engines range from two Kilowatts (2⅔ horse power) to 50 Kilowatts (66⅔ horse power.)

They are of simple design and noteworty on account of the few parts which enter into their construction, while every part is easily accessible. The alignment and adjustment is as perfect as good design and workmanship can make them. The sets occupy a maximum of floor space, the engine bed being carried out to support the dyanmo. While this construction gives a massive appearance, the bed is so carefully cored out that the capacity is approximately only 3½ watts per pound. The generators are of the four-pole type, with iron clad armatures, a special armature winding being adopted to reduce the height and length of the sets to a minimum. The sets are thus compact, simple, comparatively light and extremely durable. Many of them have already been installed on vessels built on the lakes and Atlantic seaboard, finding favor on account of the smallness of space occupied and the satisfactory service rendered. The fact of engine and dynamo being built by one responsible manufacturer was also a factor of no small importance in the conclusion of the contracts.

New Charts, Notices of Lights, Etc.

Three new charts, all corrected to June 17, 1896, have come from the hydrographic office during the past week. One is a small chart of Mud lake channels, with soundings in feet and with special reference to the vicinity of Sailors' Encampment. This chart sells at 25 cents. A chart of the entrance to Georgian bay, and the bay from French River to Little Current and Cabot head, is made from Canadian government surveys in 1884 and 1885. The price is $1.25. The third chart covers the lake front at Cleveland and is also sold at $1.25.

The latest "Notice to Mariners" from the hydrographic service reports that the steamer Omaha struck on a shoal about 1½ miles eastward of Devil's island, Apostle group, Lake Superior. The steamer was drawing 14 feet, and at the time she struck Devil's island light bore W by N., distant about 1¼ miles. This would indicate a shoaling of water between Devil's island and North Twin island.

The captain of the steamer Waverly says that 14 feet of water may now be carried through the cut from Torch bay to Torch lake in the Portage lake region. The cut is marked by three lights on cribs on the west side, and by a row of stakes on both sides. Vessels bound from Torch bay to Lake Linden should follow the center of the bay, taking care to leave the red stakes to port and the black stakes to starboard. When the nearest two cribs are in range steer for them, until the stakes can be seen, then follow them through the cut.

A notice from the light-house board regarding Racine pierhead light station says: A fixed red light of the sixth order has been reestablished in the old pierhead light tower recently removed to a point, on the outer end of the extended north pier, about 950 feet to the eastward of Racine (Root river) light-house. With Racine light (white) the new light will guide clear to the northward of Racine reef, by keeping the white light open to the northward of the new red light. The fixed red lantern light, which was shown at a point about 800 feet to the eastward of Racine light, has been discontinued. A fog bell has been established at this station, to be struck by machinery during thick or foggy weather, a single blow every twenty seconds.

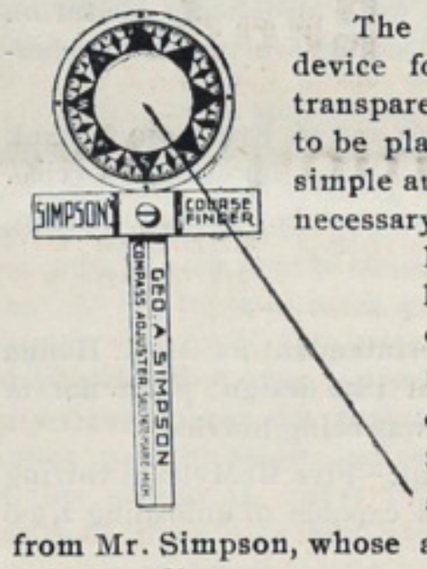
A shoal with but 15 feet of water over it and hard bottom has been reported off the entrance to Presque Isle bay, Erie harbor, 100 yards E. ½ S. from red can buoy No. 2.

Now that the government steamer Michigan has begun survey work in the vicinity of Kelley's, Middle and South Bass island's Lake Erie, a corrected chart of the south passage from Detroit river to Ohio ports may be expected shortly, and it will be welcomed by vessels trading to Toledo and Sandusky, as well as the smaller craft running to ports farther down Lake Erie, but which are often compelled to follow this passage in unfavorable weather.

Furnace Flues on River Steamers.

Apropos of boiler furnace flues, corrugated or otherwise designed to secure stiffness and resistance to collapse, it is worth recalling that it has been the practice on the western rivers in the United States for many years to make the large tubes of the two-flue river steamer boilers, carrying from 175 to 180 pounds pressure, of numerous short sheets, thus securing a great many riveted joints. The double thickness of plates at a large number of points gave what was considered a very serviceable means of guarding against the flattening out of the flues, and the experience of many years demonstrated the soundness of this view. Engineers from other parts who go west and see a western American river steamer generally agree that they do not know how to build steamboats there; but the fact is that the boats and the boilers in use there have grown up as the things best adapted to the country and the circumstances. It may have been that in the earlier days it was difficult to make large sheets and get sound sheets, and yet there is strongly presumptive evidence that the point was to get short sheets and plenty of joints, for the purpose stated.—Cassier's Magazine.

Simpson's Course Finder.



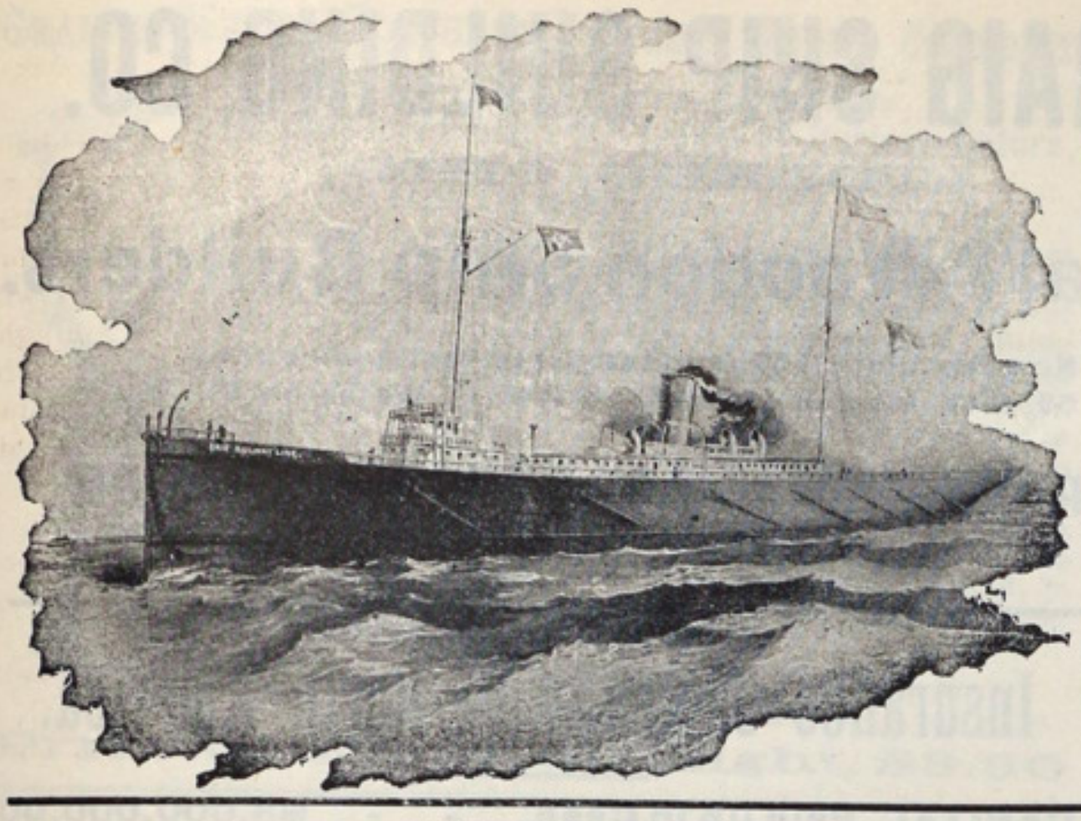
The illustration herewith shows a convenient device for finding courses on charts. The dial is transparent, enabling the object or position of the ship to be placed directly under the center of it. It is so simple and easily understood that no explanation is necessary. It is substantial, neat in appearance and handy also in size, as it is not too large to be kept in one of the drawers of a chart table or desk. Quite a large number of these instruments have been sold this season to masters on the lakes by the inventor, George A. Simpson, who is well known as a compass adjuster. The course finder may be obtained from Mr. Simpson, whose addresss is Sault Ste. Marie, Mich., or from ship chandlers.

Navy Dry Docks in the United States.

With the completion recently of the Port Royal dock on the Atlantic coast and the Port Orchard dock in Washington on the Pacific, the United States navy department now has ten large dry docks completed for war ships as follows:

Location.	Material.	Length, feet.	Width floor, feet.	Water, ft.	in.
Boston	Stone	391	30	27	0
Brooklyn	Stone	350	30	25	6
Brooklyn	Timber	530	50	25	6
League Island	Timber	530	50	25	6
Norfolk	Stone	360	30	24	0
Norfolk	Timber	530	50	25	6
Port Royal	Timber	600	50	26	0
Port Orchard	Timber	650	50	26	0
Mare Island	Stone	530	30	28	0

Specifications for the Rockefeller steamers require the use of the Chase fog whistle machine. Over one hundred modern lake steamers are equipped with this device, which has been improved to comply with the latest regulations for lake steamers. It is manufactured by the Chase Machine Co., Cleveland.



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RIVER DOCK, West River Street. Telephone 1441.

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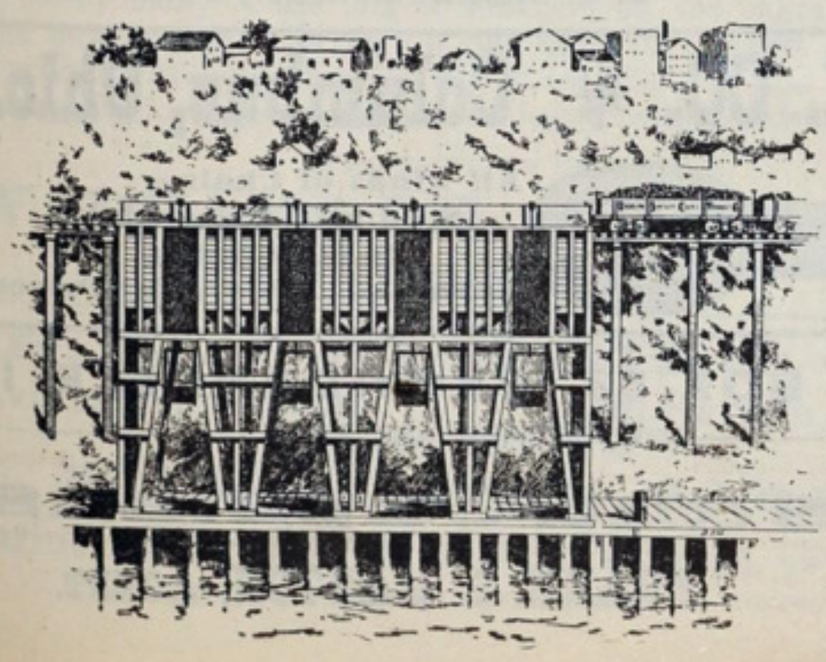
Cuyahoga River, just above Superior St. Viaduct, Cleveland, O.



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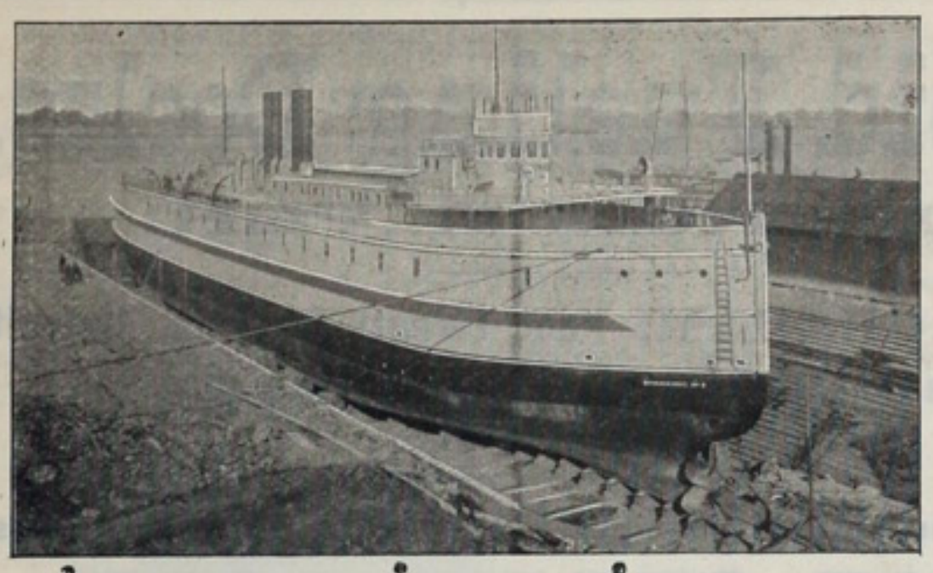

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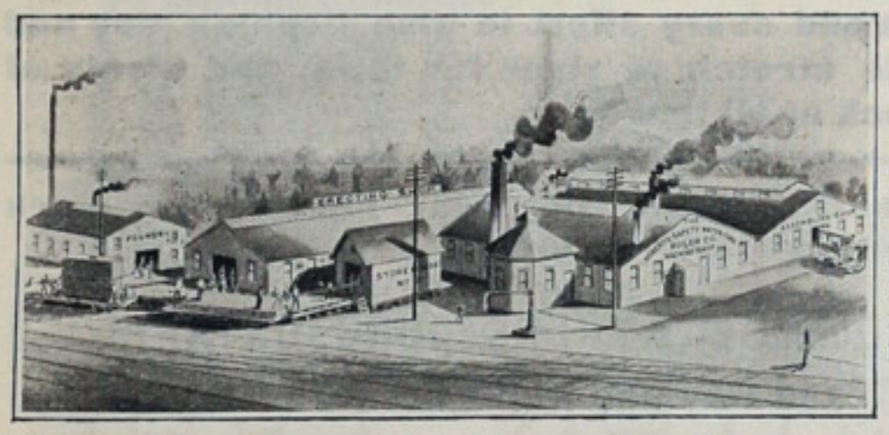

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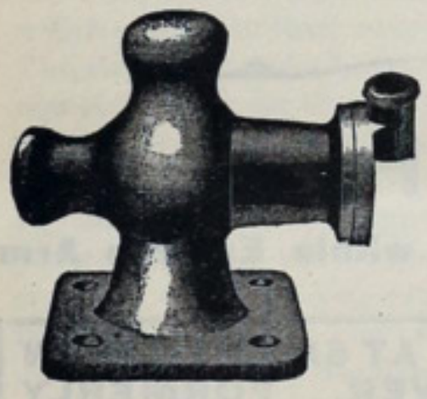

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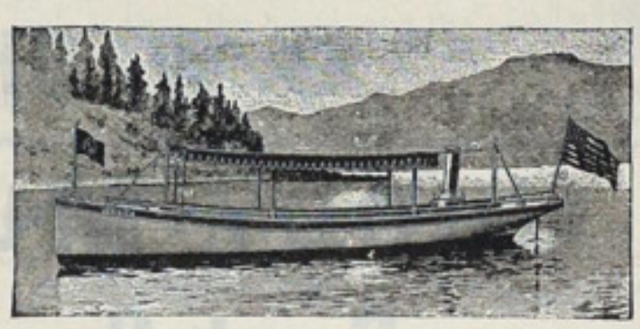

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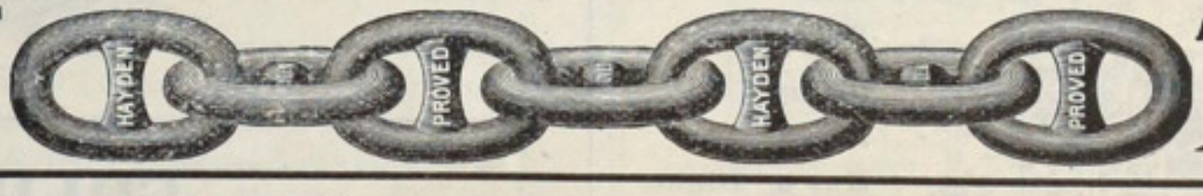

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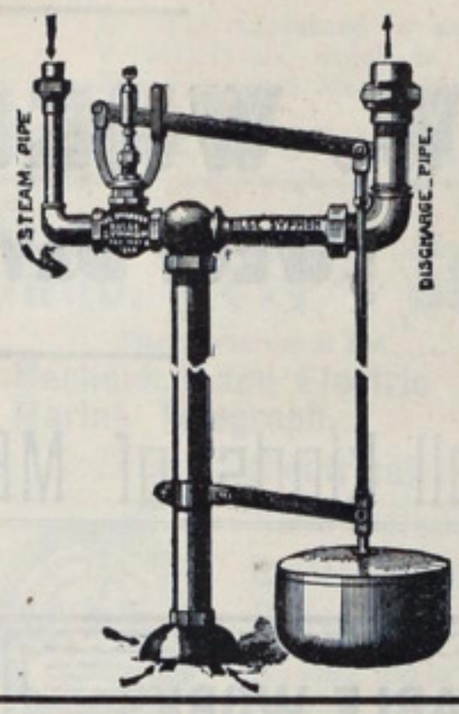

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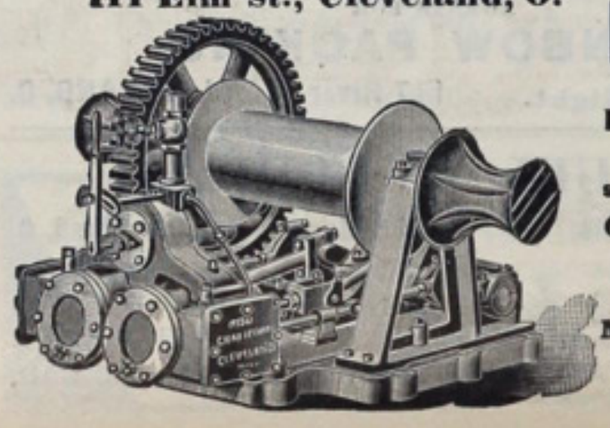

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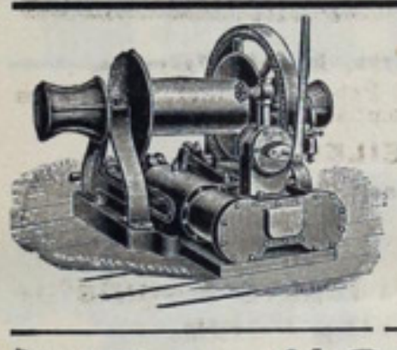

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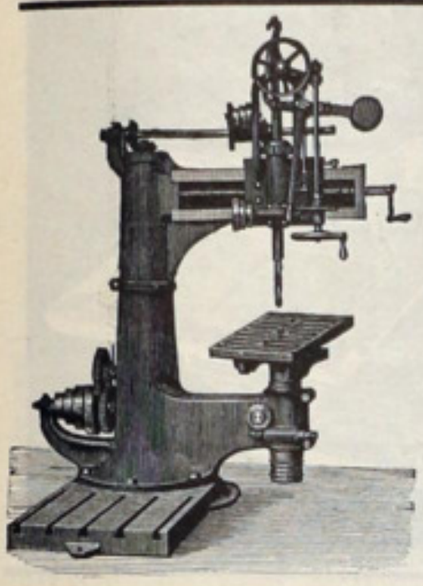

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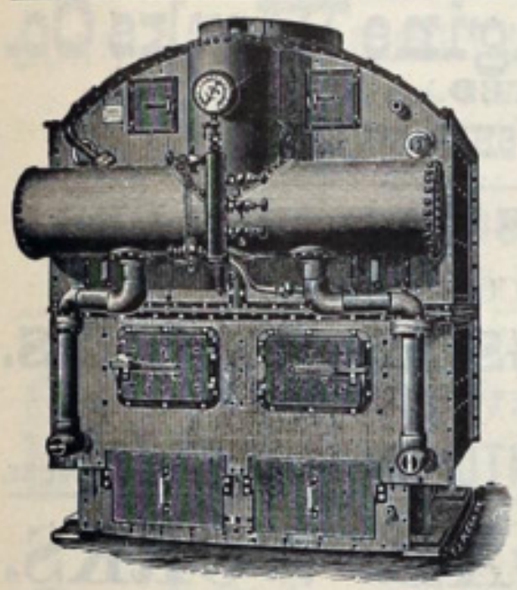

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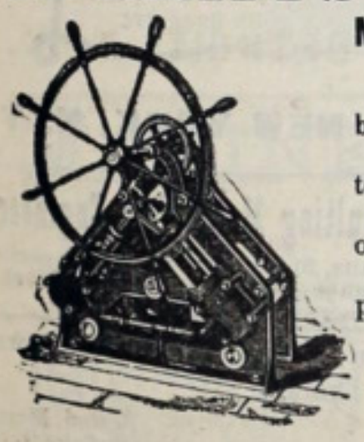

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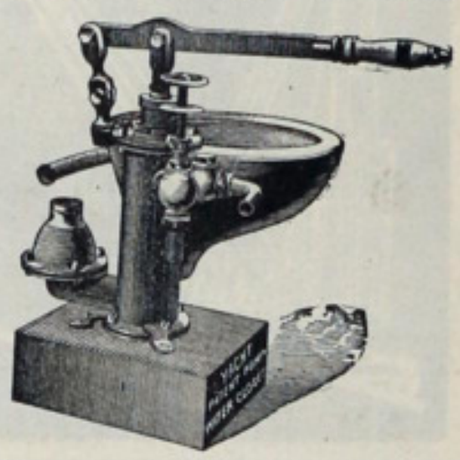

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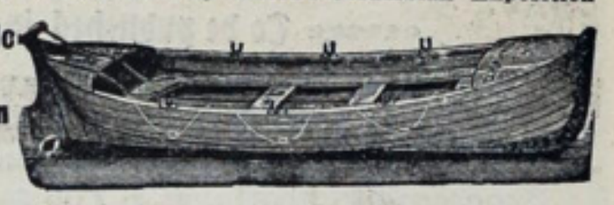

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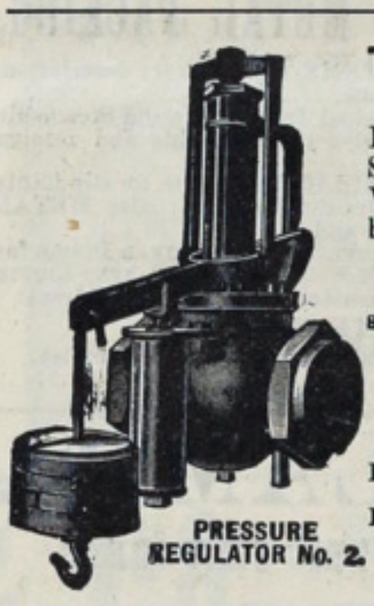

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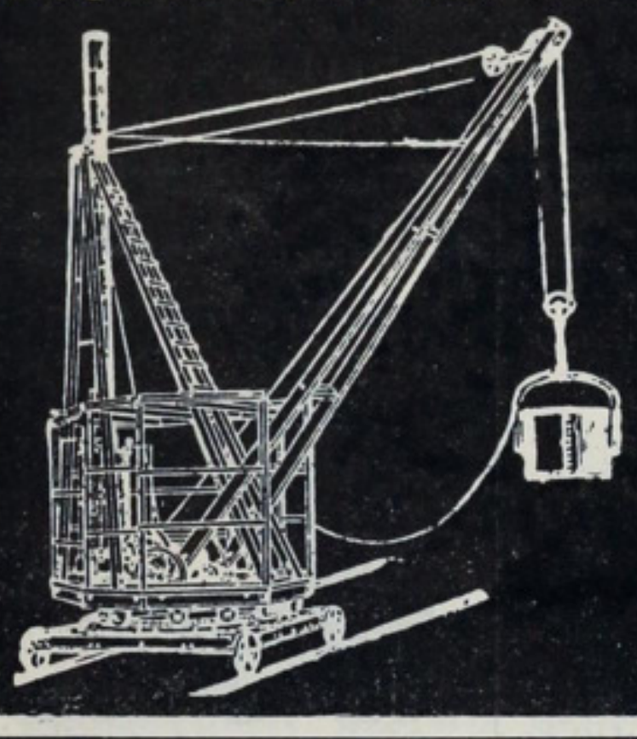

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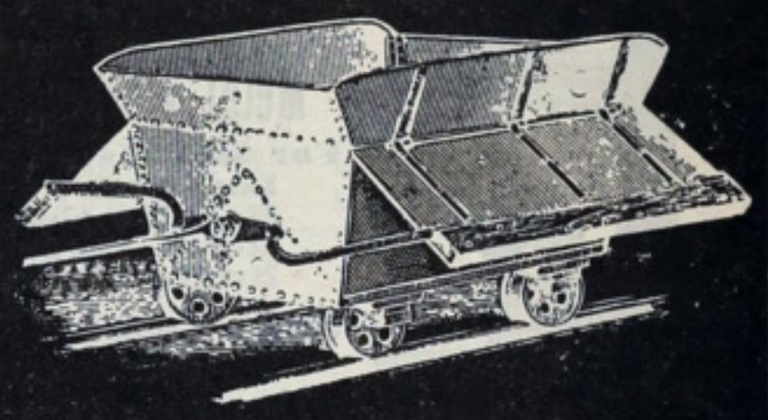

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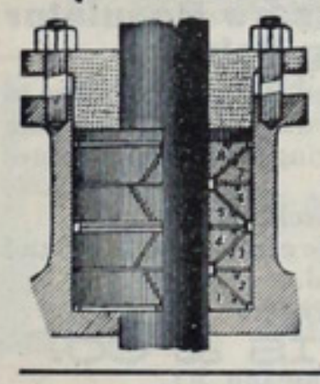

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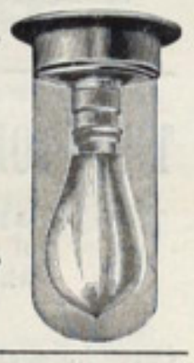

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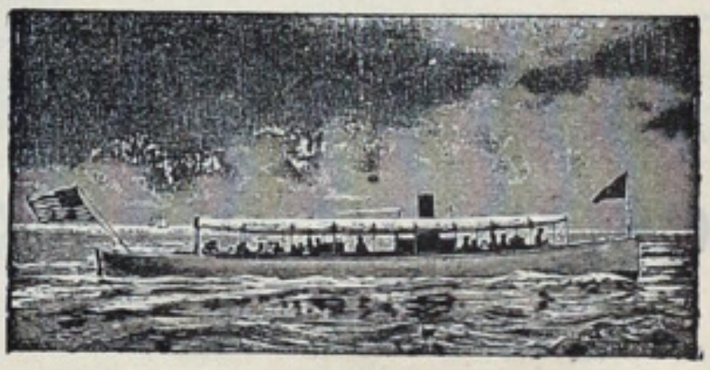

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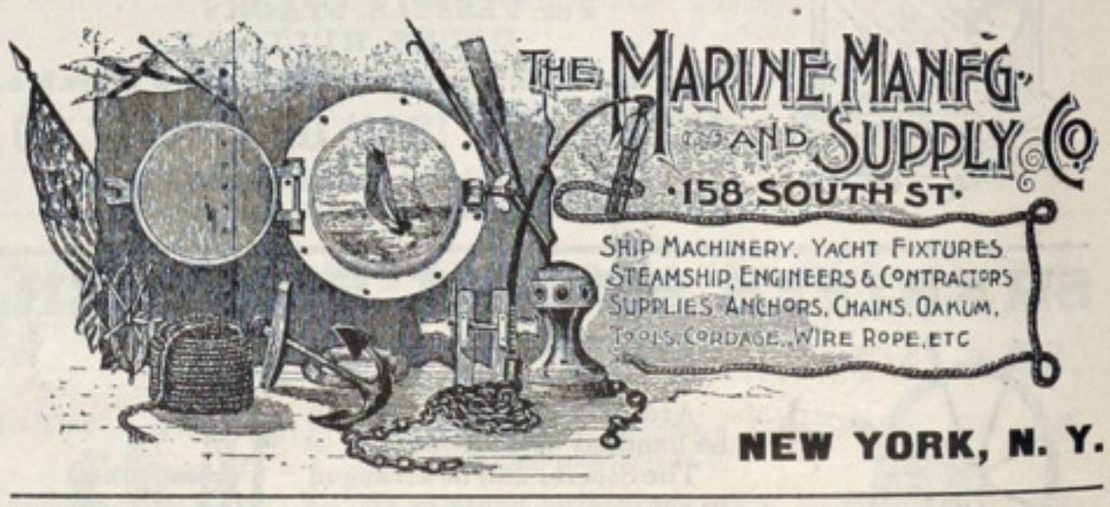
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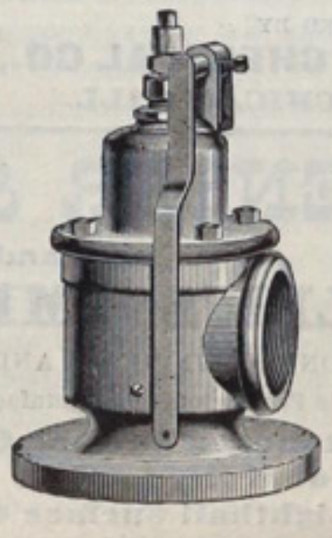

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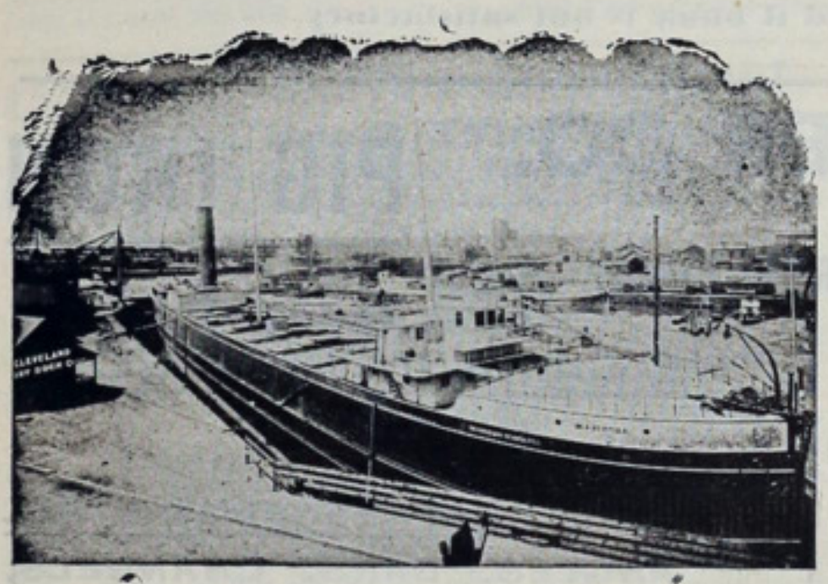

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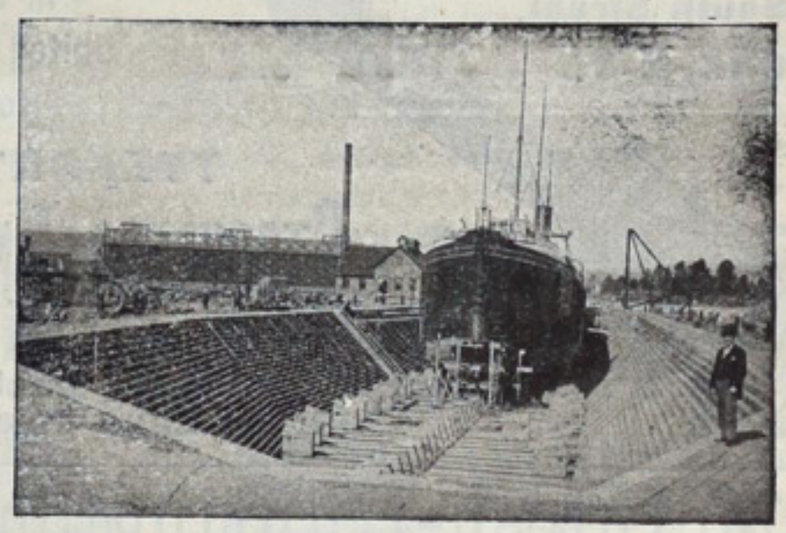

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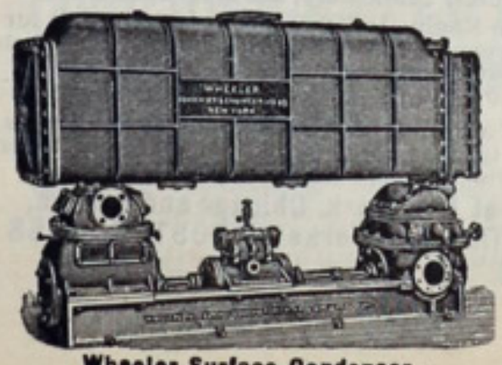

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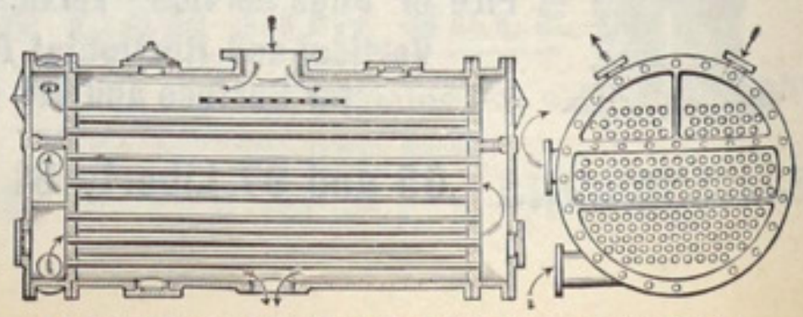

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